

- ☐ Final Report
☐ Re-Issued Report
☒ Revised Report

Report Date:
13-Mar-17 11:00

Laboratory Report

Gulf Oil L.P.
281 Eastern Avenue
Chelsea, MA 02150
Attn: Andrew P. Adams

Project: Gulf Terminal - Chelsea, MA
Project #: Gulf Chelsea

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SC32143-01	Outfall 003	Surface Water	27-Feb-17 08:00	03-Mar-17 16:51

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met.

Massachusetts # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87936
Maine # MA138
New Hampshire # 2972/2538
New Jersey # MA011
New York # 11393
Pennsylvania # 68-04426/68-02924
Rhode Island # LAO00348
USDA # P330-15-00375
Vermont # VT-11393



Authorized by:



June O'Connor
Laboratory Director

Eurofins Spectrum Analytical holds primary certification in the State of Massachusetts for the analytes as indicated with an X in the "Cert." column within this report. Please note that the State of Massachusetts does not offer certification for all analytes. Please refer to our website for specific certification holdings in each state.

Please note that this report contains 12 pages of analytical data plus Chain of Custody document(s). When the Laboratory Report is indicated as revised, this report supersedes any previously dated reports for the laboratory ID(s) referenced above. Where this report identifies subcontracted analyses, copies of the subcontractor's test report are available upon request. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

Eurofins Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Eurofins Spectrum Analytical, Inc. is currently accredited for the specific method or analyte indicated. Please refer to our Quality web page at www.spectrum-analytical.com for a full listing of our current certifications and fields of accreditation. States in which Eurofins Spectrum Analytical, Inc. holds NELAC certification are New York, New Hampshire, New Jersey, Pennsylvania and Florida. All analytical work for Volatile Organic and Air analysis is transferred to and conducted at our 830 Silver Street location (PA-68-04426).

Please contact the Laboratory or Technical Director at 800-789-9115 with any questions regarding the data contained in this laboratory report.

CASE NARRATIVE:

Data has been reported to the RDL. This report excludes estimated concentrations detected below the RDL and above the MDL (J-Flag).

All non-detects and all results below the reporting limit are reported as "<" (less than) the reporting limit in this report.

The samples were received 2.9 degrees Celsius, please refer to the Chain of Custody for details specific to temperature upon receipt. An infrared thermometer with a tolerance of +/- 1.0 degrees Celsius was used immediately upon receipt of the samples.

If a Matrix Spike (MS), Matrix Spike Duplicate (MSD) or Duplicate (DUP) was not requested on the Chain of Custody, method criteria may have been fulfilled with a source sample not of this Sample Delivery Group.

Analyses for Total Hardness, pH, and Total Residual Chlorine fall under the state of Pennsylvania code Chapter 252.6 accreditation by rule.

March 13, 2017 Report Revision Case Narrative:

This report is being revised to correct the data for the 8270 and 8260 as indicated on the chain of custody.

See below for any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

EPA 1664B

Laboratory Control Samples:

1704123 BS

Oil & Grease percent recovery 35 (83-101) is outside individual acceptance criteria, but within overall method allowances. All reported results of the following samples are considered to have a potentially low bias:

Outfall 003

1704123-BS1

Data for this analyte may be biased low based on QC spike recoveries.

Oil & Grease

SW846 8260C

Calibration:

S702865-ICV1

Analyte percent recovery is outside individual acceptance criteria (80-120).

Naphthalene (121%)

This affected the following samples:

1704046-BLK1
1704046-BS1
1704046-BSD1
Outfall 003
S702847-CCV1

SW846 8270D SIM

Samples:

S702955-CCV1

Analyte percent difference is outside individual acceptance criteria (20), but within overall method allowances.

Indeno (1,2,3-cd) pyrene (21.2%)
Naphthalene (23.3%)

SW846 8270D SIM

Samples:

S702955-CCV1

This affected the following samples:

1704003-BLK2

1704003-BS2

1704003-BSD2

Outfall 003

Sample Acceptance Check Form

Client: Gulf Oil L.P.
Project: Gulf Terminal - Chelsea, MA / Gulf Chelsea
Work Order: SC32143
Sample(s) received on: 3/3/2017

The following outlines the condition of samples for the attached Chain of Custody upon receipt.

	<u>Yes</u>	<u>No</u>	<u>N/A</u>
Were custody seals present?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Were custody seals intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were samples received at a temperature of $\leq 6^{\circ}\text{C}$?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were samples refrigerated upon transfer to laboratory representative?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were sample containers received intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were samples properly labeled (labels affixed to sample containers and include sample ID, site location, and/or project number and the collection date)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were samples accompanied by a Chain of Custody document?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does Chain of Custody document include proper, full, and complete documentation, which shall include sample ID, site location, and/or project number, date and time of collection, collector's name, preservation type, sample matrix and any special remarks concerning the sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did sample container labels agree with Chain of Custody document?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were samples received within method-specific holding times?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Summary of Hits

Lab ID: SC32143-01

Client ID: Outfall 003

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Total Suspended Solids	2.0		0.5	mg/l	SM2540D (11)

Please note that because there are no reporting limits associated with hazardous waste characterizations or micro analyses, this summary does not include hits from these analyses if included in this work order.

Sample Identification

Outfall 003

SC32143-01

Client Project #

Gulf Chelsea

Matrix

Surface Water

Collection Date/Time

27-Feb-17 08:00

Received

03-Mar-17

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>MDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Analyst</i>	<i>Batch</i>	<i>Cert.</i>
Volatile Organic Compounds													
<u>Volatile Organic Aromatics by SW846 8260</u>													
<u>Prepared by method SW846 5030 Water MS</u>													
71-43-2	Benzene	< 1.0		µg/l	1.0	0.3	1	SW846 8260C	06-Mar-17	06-Mar-17	GMA	1704046	
91-20-3	Naphthalene	< 1.0		µg/l	1.0	0.4	1	"	"	"	"	"	
<i>Surrogate recoveries:</i>													
460-00-4	4-Bromofluorobenzene	104			70-130 %			"	"	"	"	"	
2037-26-5	Toluene-d8	104			70-130 %			"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	99			70-130 %			"	"	"	"	"	
1868-53-7	Dibromofluoromethane	101			70-130 %			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
<u>SVOCs by SIM</u>													
<u>Prepared by method SW846 3510C</u>													
50-32-8	Benzo (a) pyrene	< 0.051		µg/l	0.051	0.037	1	SW846 8270D SIM	06-Mar-17	08-Mar-17	MSL	1704003	
91-20-3	Naphthalene	< 0.051		µg/l	0.051	0.027	1	"	"	"	"	"	
<i>Surrogate recoveries:</i>													
205440-82-0	Benzo (e) pyrene-d12	110			30-130 %			"	"	"	"	"	
Extractable Petroleum Hydrocarbons													
<u>Prepared by method SW846 3510C</u>													
	Oil & Grease	< 1.01		mg/l	1.01	0.239	1	EPA 1664B	07-Mar-17	09-Mar-17	KK	1704123	X
General Chemistry Parameters													
	pH	7.68		pH Units			1	ASTM D 1293-99B	03-Mar-17 19:00	03-Mar-17 19:00	TY	1704006	X
	Total Suspended Solids	2.0		mg/l	0.5	0.2	1	SM2540D (11)	04-Mar-17	09-Mar-17	CMB	1704008	X

This laboratory report is not valid without an authorized signature on the cover page.

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1704046 - SW846 5030 Water MS										
<u>Blank (1704046-BLK1)</u>					<u>Prepared & Analyzed: 06-Mar-17</u>					
Benzene	< 1.0		µg/l	1.0						
Ethylbenzene	< 1.0		µg/l	1.0						
Methyl tert-butyl ether	< 1.0		µg/l	1.0						
Naphthalene	< 1.0		µg/l	1.0						
Toluene	< 1.0		µg/l	1.0						
m,p-Xylene	< 2.0		µg/l	2.0						
o-Xylene	< 1.0		µg/l	1.0						
Surrogate: 4-Bromofluorobenzene	51.5		µg/l		50.0		103	70-130		
Surrogate: Toluene-d8	52.2		µg/l		50.0		104	70-130		
Surrogate: 1,2-Dichloroethane-d4	52.0		µg/l		50.0		104	70-130		
Surrogate: Dibromofluoromethane	50.6		µg/l		50.0		101	70-130		
<u>LCS (1704046-BS1)</u>					<u>Prepared & Analyzed: 06-Mar-17</u>					
Benzene	23.3		µg/l		20.0		116	70-130		
Ethylbenzene	20.5		µg/l		20.0		102	70-130		
Methyl tert-butyl ether	21.9		µg/l		20.0		110	70-130		
Naphthalene	21.6		µg/l		20.0		108	70-130		
Toluene	23.1		µg/l		20.0		116	70-130		
m,p-Xylene	21.2		µg/l		20.0		106	70-130		
o-Xylene	20.8		µg/l		20.0		104	70-130		
Surrogate: 4-Bromofluorobenzene	50.3		µg/l		50.0		101	70-130		
Surrogate: Toluene-d8	53.9		µg/l		50.0		108	70-130		
Surrogate: 1,2-Dichloroethane-d4	51.9		µg/l		50.0		104	70-130		
Surrogate: Dibromofluoromethane	52.5		µg/l		50.0		105	70-130		
<u>LCS Dup (1704046-BSD1)</u>					<u>Prepared & Analyzed: 06-Mar-17</u>					
Benzene	20.4		µg/l		20.0		102	70-130	13	20
Ethylbenzene	18.7		µg/l		20.0		94	70-130	9	20
Methyl tert-butyl ether	21.6		µg/l		20.0		108	70-130	2	20
Naphthalene	19.8		µg/l		20.0		99	70-130	9	20
Toluene	21.4		µg/l		20.0		107	70-130	8	20
m,p-Xylene	19.3		µg/l		20.0		97	70-130	9	20
o-Xylene	19.2		µg/l		20.0		96	70-130	8	20
Surrogate: 4-Bromofluorobenzene	50.6		µg/l		50.0		101	70-130		
Surrogate: Toluene-d8	53.3		µg/l		50.0		107	70-130		
Surrogate: 1,2-Dichloroethane-d4	50.4		µg/l		50.0		101	70-130		
Surrogate: Dibromofluoromethane	51.9		µg/l		50.0		104	70-130		

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1704003 - SW846 3510C										
<u>Blank (1704003-BLK2)</u>					<u>Prepared: 06-Mar-17 Analyzed: 08-Mar-17</u>					
Acenaphthene	< 0.050		µg/l	0.050						
Acenaphthylene	< 0.050		µg/l	0.050						
Anthracene	< 0.050		µg/l	0.050						
Benzo (a) anthracene	< 0.050		µg/l	0.050						
Benzo (a) pyrene	< 0.050		µg/l	0.050						
Benzo (b) fluoranthene	< 0.050		µg/l	0.050						
Benzo (g,h,i) perylene	< 0.050		µg/l	0.050						
Benzo (k) fluoranthene	< 0.050		µg/l	0.050						
Chrysene	< 0.050		µg/l	0.050						
Dibenzo (a,h) anthracene	< 0.050		µg/l	0.050						
Fluoranthene	< 0.050		µg/l	0.050						
Fluorene	< 0.050		µg/l	0.050						
Indeno (1,2,3-cd) pyrene	< 0.050		µg/l	0.050						
Naphthalene	< 0.050		µg/l	0.050						
Phenanthrene	< 0.050		µg/l	0.050						
Pyrene	< 0.050		µg/l	0.050						
<i>Surrogate: Benzo (e) pyrene-d12</i>	<i>1.35</i>		<i>µg/l</i>		<i>2.00</i>		<i>68</i>	<i>30-130</i>		
<u>LCS (1704003-BS2)</u>					<u>Prepared: 06-Mar-17 Analyzed: 08-Mar-17</u>					
Acenaphthene	0.962		µg/l	0.050	1.00		96	40-140		
Acenaphthylene	0.995		µg/l	0.050	1.00		100	40-140		
Anthracene	0.742		µg/l	0.050	1.00		74	40-140		
Benzo (a) anthracene	0.949		µg/l	0.050	1.00		95	40-140		
Benzo (a) pyrene	0.993		µg/l	0.050	1.00		99	40-140		
Benzo (b) fluoranthene	1.10		µg/l	0.050	1.00		110	40-140		
Benzo (g,h,i) perylene	0.963		µg/l	0.050	1.00		96	40-140		
Benzo (k) fluoranthene	0.865		µg/l	0.050	1.00		86	40-140		
Chrysene	0.933		µg/l	0.050	1.00		93	40-140		
Dibenzo (a,h) anthracene	1.07		µg/l	0.050	1.00		107	40-140		
Fluoranthene	0.834		µg/l	0.050	1.00		83	40-140		
Fluorene	0.989		µg/l	0.050	1.00		99	40-140		
Indeno (1,2,3-cd) pyrene	1.16		µg/l	0.050	1.00		116	40-140		
Naphthalene	1.10		µg/l	0.050	1.00		110	40-140		
Phenanthrene	0.778		µg/l	0.050	1.00		78	40-140		
Pyrene	0.880		µg/l	0.050	1.00		88	40-140		
<i>Surrogate: Benzo (e) pyrene-d12</i>	<i>1.39</i>		<i>µg/l</i>		<i>2.00</i>		<i>70</i>	<i>30-130</i>		
<u>LCS Dup (1704003-BS2)</u>					<u>Prepared: 06-Mar-17 Analyzed: 08-Mar-17</u>					
Acenaphthene	0.822		µg/l	0.050	1.00		82	40-140	16	20
Acenaphthylene	0.868		µg/l	0.050	1.00		87	40-140	14	20
Anthracene	0.640		µg/l	0.050	1.00		64	40-140	15	20
Benzo (a) anthracene	0.843		µg/l	0.050	1.00		84	40-140	12	20
Benzo (a) pyrene	0.857		µg/l	0.050	1.00		86	40-140	15	20
Benzo (b) fluoranthene	0.895		µg/l	0.050	1.00		90	40-140	20	20
Benzo (g,h,i) perylene	0.822		µg/l	0.050	1.00		82	40-140	16	20
Benzo (k) fluoranthene	0.794		µg/l	0.050	1.00		79	40-140	9	20
Chrysene	0.785		µg/l	0.050	1.00		78	40-140	17	20
Dibenzo (a,h) anthracene	0.912		µg/l	0.050	1.00		91	40-140	16	20
Fluoranthene	0.725		µg/l	0.050	1.00		72	40-140	14	20
Fluorene	0.868		µg/l	0.050	1.00		87	40-140	13	20
Indeno (1,2,3-cd) pyrene	0.958		µg/l	0.050	1.00		96	40-140	19	20
Naphthalene	0.962		µg/l	0.050	1.00		96	40-140	14	20
Phenanthrene	0.709		µg/l	0.050	1.00		71	40-140	9	20

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1704003 - SW846 3510C										
<u>LCS Dup (1704003-BSD2)</u>					<u>Prepared: 06-Mar-17 Analyzed: 08-Mar-17</u>					
Pyrene	0.771		µg/l	0.050	1.00		77	40-140	13	20
Surrogate: Benzo (e) pyrene-d12	1.19		µg/l		2.00		60	30-130		

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Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1704123 - SW846 3510C										
<u>Blank (1704123-BLK1)</u>										
Oil & Grease	< 1.00		mg/l	1.00						
<u>LCS (1704123-BS1)</u>										
Oil & Grease	5.70	BsL	mg/l	1.00	16.5		35	83-101		

Prepared: 07-Mar-17 Analyzed: 09-Mar-17

Prepared: 07-Mar-17 Analyzed: 09-Mar-17

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1704006 - General Preparation										
<u>Reference (1704006-SRM3)</u>					<u>Prepared & Analyzed: 03-Mar-17</u>					
pH	6.04		pH Units		6.00		101	97.5-102.5		
<u>Reference (1704006-SRM4)</u>					<u>Prepared & Analyzed: 03-Mar-17</u>					
pH	6.00		pH Units		6.00		100	97.5-102.5		
Batch 1704008 - General Preparation										
<u>Blank (1704008-BLK1)</u>					<u>Prepared: 04-Mar-17 Analyzed: 09-Mar-17</u>					
Total Suspended Solids	< 0.5		mg/l	0.5						
<u>LCS (1704008-BS1)</u>					<u>Prepared: 04-Mar-17 Analyzed: 09-Mar-17</u>					
Total Suspended Solids	94.0		mg/l	10.0	100		94	90-110		

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Notes and Definitions

BsL	Data for this analyte may be biased low based on QC spike recoveries.
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference
OG	The required Matrix Spike and Matrix Spike Duplicate (MS/MSD) for Oil & Grease method 1664B can only be analyzed when the client has submitted sufficient sample volume. An extra liter per MS/MSD is required to fulfill the method QC criteria. Please refer to Chain of Custody and QC Summary (MS/MSD) of the Laboratory Report to verify ample sample volume was submitted to fulfill the requirement.
pH	The method for pH does not stipulate a specific holding time other than to state that the samples should be analyzed as soon as possible. For aqueous samples the 40 CFR 136 specifies a holding time of 15 minutes from sampling to analysis. Therefore all aqueous pH samples not analyzed in the field are considered out of hold time at the time of sample receipt. All soil samples are analyzed as soon as possible after sample receipt.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

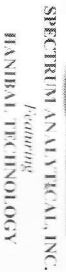
Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Continuing Calibration Verification: The calibration relationship established during the initial calibration must be verified at periodic intervals. Concentrations, intervals, and criteria are method specific.



Page 1 of 1

Special Handling:

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

State: MA

QA/QC Reporting Notes:

☐ MA DEF MCF CAM Report? ☐ Yes ☐ No
☐ CT DRH RCP Report? ☐ Yes ☐ No
☒ Standard ☐ No QC
☐ DQA* ☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*

☐ Other: _____

State-specific monitoring standards:

benzene 2 µg/L

aphthalene 5 μ g

benzo(a)pyrene 0.1 µg/L

adams@gulf.foi.com, cyril@gulf.foi.com

Observed	2.9
Correction Factor	0
Corrected	0

☐ Intact ☐ Broker☐ Soil Jar Frozen